COVID-19 and Radiation Oncology: a 2-phase planning in a mono-institutional experience in Central Italy

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Abstract

Background: COVID-19 in Italy has led to a reorganization of hospital activities with risks of cancer treatments discontinuity. We report a management model in the two phases of the COVID-19 emergency, lockdown phase I and post-lockdown phase II.

Methods: Actions were planned in the two phases: workloads of the visits and radiotherapy planning, dedicated routes, measures for triage areas, management of suspected and positive COVID-19 cases, personal protective equipment, environments and intra-institutional meetings and tumor boards management.

Results: Comparing our radiotherapy activity in the period March 9- May 4, 2019 with the same period of 2020 in full phase I of the COVID-19 emergency, no changes were observed.

First radiotherapy visits, Simulation Computed Tomography and Linear Accelerators treatments were 123, 137 and 151 in 2019 respect to 121, 135 and 170 in 2020.

There were no cases of COVID-19 positivity recorded either in patients or in healthcare professionals who were all negative to the buffers performed.

Conclusions: The model planned in our experience in both phases has guaranteed continuity of radiotherapy treatments without workload reduction nor treatment interruption ensuring safety of cancer patients, environments and staff.

Introduction

The rapid and uncontrolled spread of COVID-19 in some regions and provinces of northern Italy led to the declaration of partial and complete lockdown of the entire country by the national government between March 8 and March 22, 2020 and this phase, called Phase I, lasted from March 9 to May 3, 2020 [1-3]. From May 4, 2020 the so-called Phase II was approved, a gradual slowdown of the phase I thanks to the descent of the epidemic curve [4] (Figure 1). At June 7, 2020 Italy recorded a total of 234,998 COVID-19 cases, 168,640 recovered, 32,459 in home isolation and 33,899 deaths [5]. Until the middle of April, the number of patients hospitalized in the intensive and non-intensive care units was progressively important with the consequent need for a complete reorganization of the hospitals. The territorial heterogeneity of the COVID-19 trend has seen a decisive and dramatic prevalence in the areas of northern Italy and a more contained incidence in the areas of central and southern Italy (Figure 2) [5].

Abruzzo, a region of central Italy with a population of 1,304,970 people, recorded at June 7, 2020 a total number of cases of 3,265 (1.39%) with a peak of infections on March 29, 2020, a maximum hospital load on April 3, 2020, 418 deaths, 2,215 recovered and 632 in home isolation [6] (Figure 3). Therefore, although with smaller numbers, the Abruzzo region also experienced an important distress and centered COVID-19 reorganization of hospital activities with the interruption on March 13, 2020 of all scheduled hospitalizations both medical and surgical with the exception of onco- hematological services non-deferrable at clinical judgment. In fact, for cytostatic, radiation oncology or immunological treatments, the Ministry of Health has

recommended to the local Health Authorities to guarantee these "life-saving" treatments to all patients and to plan paths and spaces dedicated to patients being treated as well as all individual protective devices necessary [7-8]. In this regard, the Italian Association of Radiotherapy and Clinical Oncology (AIRO) worked out a document to make homogeneous the radiotherapy operating procedures during the ongoing

COVID-19 emergency [9] and conducted a targeted national survey [10]. Furthermore, several experiences have been published on the management of radiation therapy during this pandemic time [11-17]. We report our experience in the organizational planning of radiotherapy in the two phases of the COVID-19 emergency, the lockdown phase I and the post-lockdown phase II in order to guarantee continuity of treatments, the safety of cancer patients and of healthcare personnel within a framework of complete reorganization COVID-19 centered at the University Hospital of Chieti.

Materials And Methods

Radiation Oncology Center of Chieti is one of the four Radiotherapy centers in the Abruzzo region, it is equipped with two Linear Accelerators (Linacs) that both work with a double workshift from 8.00 a.m. to 8.30 p.m., a Simulation Computed Tomography (Simul CT) and clinical dosimetry that in ordinary regime work from 8.00 a.m. to 2.00 pm, a clinic room dedicated to the first radiotherapy visits and a clinic room dedicated to the follow-up of cancer patients both with ordinary workshift from 8.00 am to 2.00 pm, an oncological day-hospital unit for the management of concurrent radio- chemotherapy treatments.

The Radiotherapy staff is composed of 11 doctors, 14 technicians, 3 dedicated physicists, 5 nurses, 2 administrative staff, a socio-health operator, a secretary. The center is also a university site with a specialization school in Radiation Oncology with a total of 7 resident doctors and for a total staff of 44 units. An average of around 800 patients are treated each year. Table 1 shows the arrangement actions of the radiotherapy activities planned with the Hospital Management and the Hospital Quality Office, respectively, in lockdown phase I and in post-lockdown phase II of the COVID-19 pandemic time.

Results

Comparing the center activity in the period March 9- May 4, 2019 in ordinary routine conditions, with the same time interval March 9- May 4, 2020, in full lockdown phase I of the COVID-19 emergency, no changes were observed on the number of services performed. Particularly, in 2019, 123 first radiotherapy visits were performed, 137 new patients were prepared for Simul CT and 151 patients were treated on Linear Accelerators. In the same period of 2020 and during the pandemic critical phase, planned actions allowed to perform 121 first radiotherapy visits, 135 new patients were prepared for Simul CT and 170 patients were treated on Linear Accelerators (Table 2). Dose hypofractionation has been predominantly used in breast, prostate and palliative treatments. There were no cases of COVID-19 positivity recorded in patients or in healthcare professionals both in phase I and in phase II. About it, in the week from May 25 to May 31, 2020 all the staff of the Center underwent oropharyngeal and nasopharyngeal buffer with negative results in 42 examined. Two workers have not been examined since, respectively, in maternity and illness since last year.

Discussion

The serious COVID-19 pandemic that hit Italy led to a serious suffering for the national hospital system which had to reorganize the assistance network with centered COVID-19 hospitals and with a prevalence of intensive and sub-intensive care units. Many internal and surgical departments have been reconverted and dedicated to the management of COVID-19 in a few weeks and also the radiological and laboratory diagnostic activities have been seriously involved. Although with more contained case numbers than in the regions and provinces of northern Italy, the main hospitals in the Abruzzo region and, specifically from our experience, the University Hospital of Chieti, were reorganized in this direction in a short time. This situation led to a double risk: potential and dangerous delays or interruptions in oncological therapies, considered "life-saving" treatments in patients who are often already frail and a high risk of infections in patients, carers and health personnel. Several scientific documents and papers published in the literature represented an important reference especially in the first phase of the emergency [11-17] and with regard to the use of protection systems, triage procedures and the use of hypofractionation schemes. In particular, a national survey conducted by the Italian Society of Radiotherapy and Clinical Oncology and even before a survey of the radiotherapy centers of the Lombardy region, the region most affected by COVID-19 [10, 14], reported the measures adopted by the centers for the arrangement of the centers, the workloads and the COVID-19 cases found. Most of the measures adopted and reported in the surveys are in line with the planned approach in our experience with the exception of the "working from home mode" which cannot be used in our center due to the absence of dedicated technology. Overall, the clinical activity of the Italian centers underwent a reduction of <10% in 32% of cases and between 10-30% of cases in 30.4%. In our experience, the clinical activity in the lockdown phase was comparable to the clinical activity of the same observation period of 2019 and, except for a rescheduling of the oncological follow-up visits, there were no interruptions of the treatments nor a reduction in the radiotherapy preparation and in the beginning of new cancer patients. The national survey also reports 29.6% of the positive or suspect cases treated in Italian centers. No positive or suspicious cases were found in our experience both in phase I and in phase II. However, the difference on the reduction of workloads and on the number of positive or suspect patients reported in the national survey consists in the predominance of the COVID-19 cases in the regions of northern Italy and in particular in Lombardy where 10-50% reduction in radiotherapy workloads has been registered, but also in greater organizational awareness due to the increase of national and international guidelines emerging in the meantime in the literature and in the detailed recommendations on the individual tumor pathologies treated in terms of use of hypofractionated regimens [22-26]. In our experience, dose hypofractionation has been used in breast, prostate and palliation cancers.

Conclusions

The organizational model implemented in our experience, respectively, in the lockdown phase I and in the post-lockdown phase II has ensured an optimal continuity of radiotherapy workflow without reducing the workload and without interrupting the radiation therapy cycles, the safety of the cancer patients, of the environments and of the radiation oncology staff. It is therefore recommended that each Radiation Oncology center should customize its organizational model in the COVID-19 management based on the characteristics

and directives of the Hospital and on the specific features of the center in terms of equipment, staff and environments.

Abbreviations

AIRO: Italian Association of Radiotherapy and Clinical Oncology

Linacs: Linear Accelerators

Simul CT: Simulation Computed Tomography

Declarations

Declarations of interest: none

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Authors' Contributions

LC, CR, ADP, LAU, MTa, AV, AA, MDT, MTr, MN and DG designed and coordinate the study and the analysis. CR, FP, GCe, LG, DF, FCDG, CB, MB, GCa, SM, CT, DM and SS collected the data. MDF, ADN and NC performed main data analysis and provided pictures elaboration. LC, CR, ADP, LAU, MTa, AV, AA, MDT, MTr, MN and DG drafted the manuscript. MBDS, ATS, TS, AM, SC, CDA and NV critically revised the study and the manuscript. All authors reviewed and approved the final manuscript.

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References

1. Gazzetta Ufficiale della Repubblica Italiana, Serie n. 59, 08 Marzo 2020.
<https://www.gait/eli/gu/2020/03/08/59/sg/pdf>
2. Gazzetta Ufficiale della Repubblica Italiana, Serie n. 64, 11 Marzo 2020.
<https://www.gait/eli/gu/2020/03/11/64/sg/pdf>

3. Gazzetta Ufficiale della Repubblica Italiana, Serie n. 76, 22 Marzo 2020.
<https://www.gait/eli/gu/2020/03/22/76/sg/pdf>
4. Gazzetta Ufficiale della Repubblica Italiana, Serie n. 109, 28 Aprile 2020.
<https://www.gait/eli/gu/2020/04/28/109/sg/pdf>
5. Department of Civil Protection - Presidency of the Council of Ministers. Dipartimento della Protezione Civile, Presidenza del Consiglio dei Ministri.
<http://opendatadpc.maps.arcgis.com/apps/opsdashboard/index.html#/b0c68bce2cce478eaac82fe38d4138b1>
6. Abruzzo Region. <https://www.regabruzzo.it/content/coronavirus-abruzzo-dati-aggiornati-all%E2%80%99giugno-casi-positivi-3265>
7. Ministero della Salute- Direzione Generale della Programmazione sanitaria. "Raccomandazioni per la gestione dei pazienti oncologici e oncoematologici in corso di emergenza da COVID-19 redatte su iniziativa del Comitato Tecnico-Scientifico della Protezione Civile". REGIONE.LAZIO.REGISTRO UFFICIALE.I.0214498.10-03-2020.<http://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=73635&parte=1%20&serie=null>
8. The Royal College of Radiologists. Timely delivery of radical radiotherapy: guidelines for the management of unscheduled treatment interruptions, fourth edition |The Royal College of Radiologists. 2019; published online Jan. <https://www.rcr.auk/publication/timely-delivery-radical-radiotherapy-guidelines-management-unscheduled-treatment> (accessed March 7, 2020).
9. Documento di Indirizzo per la Valutazione e la Gestione del Rischio dei Pazienti e degli Operatori nei Reparti di Radioterapia Oncologica in corso di Diffusione del COVID-19 - Associazione Italiana di Radioterapia e Oncologia Clinica (AIRO); V. 1-AIRO, 17 Marzo 2020. <https://www.radioteit/wp-content/uploads/2020/03/v-2-Documento-AIRO-COVID-19-24-03-2020.pdf>
10. Jereczek-Fossa BA, Pepa M, Marvaso G, Bruni A, Buglione di Monale E Bastia M, Catalano G, Filippi AR, Franco P, Gambacorta MA, Genovesi D, Iatì G, Magli A, Marafioti L, Meattini I, Merlotti A, Mignogna M, Musio D, Pacelli R, Pergolizzi S, Tombolini V, Trovò M, Ricardi U, Magrini SM, Corvò R, Donato V; AIRO (Italian Association of Radiotherapy and Clinical Oncology). COVID-19 Outbreak and Cancer Radiotherapy Disruption in Italy: Survey Endorsed by the Italian Association of Radiotherapy and Clinical Oncology (AIRO). *RadiotherOncol* 2020; 149:89-93. doi: 10.1016/j.radonc.2020.04.061.
11. Simcock R, Thomas TV, Estes C, Filippi AR, Katz M A, Pereira I J, Saeed H. COVID-19: Global Radiation Oncology's Targeted Response for Pandemic *ClinTranslRadiatOncol* 2020; 22:55-68. doi: 10.1016/j.ctro.2020.03.009
12. Filippi AR, Russi E, Magrini SM, Corvò R. Letter From Italy: First Practical Indications for Radiation Therapy Departments During COVID-19 Outbreak. *Int J RadiatOncolBiolPhys.* 2020;107:597-599. doi: 10.1016/j.ijrobp.2020.03.007.

13. Pezzulla D, Macchia G, Taccari F, Sticca G, Deodato F. Radiotherapy in Southern Italy at the time of COVID-19: Options for Radiation Oncology Units. *Int J Gynecol Cancer* 2020; 30:917-919. doi: 1136/ijgc-2020-001523.
14. Jerezek-Fossa BA, Palazzi MF, Soatti CP, Cazzanigra LF, Ivaldi GB, Pepa M, Amadori M, Antognoni P, Arcangeli S, Buffoli A, Beltramo G, Berlinghieri S, Bignardi M, Bracelli S, Bruschieri L, Castiglioni S, Catalano G, Di Muzio N, Fallai C, Fariselli L, Filippi AR, Gramaglia A, Italia C, Lombardi F, Magrini SM, Nava S, Orlandi E, Pasinetti N, Sbicego EL, Scandolaro L, Scorsetti M, Stiglich F, Tonoli S, Tortini R, Valdagni R, Vavassori V, Marvaso G; CODRAL (Board of Directors of Radiation Oncology Departments in Lombardy) network. COVID-19 Outbreak and Cancer Radiotherapy Disruption in Lombardy, Northern Italy. *ClinOncol (R CollRadiol)* 2020, 32: e160-e161. doi: 1016/j.clon.2020.04.007.
15. Valenza F, Papagni G, Marchianò A, Daidone MG, DeBraud F, Colombo MP, Frignani A, Galmozzi G, Ladisa V, Prunerì G, Salvioni R, Spada P, Torresani M, Rinaldi O, Manfredi S, Votta M, Apoloni G. Response of a comprehensive cancer center to the COVID-19 pandemic: the experience of the Fondazione IRCCS-Istituto Nazionale dei Tumori di Milano. *Tumori Journal* 2020, 106, 193–202. doi: 10.1177/0300891620923790.
16. Meattini I, Franco P, Belgioia L, Boldrini L, Botticella A, De Santis MC, Marvaso G, Montesi G, Parisi S, Triggiani L, Lambertini M, Livi L. Radiation Therapy During the Coronavirus Disease 2019 (covid-19) Pandemic in Italy: A View of the Nation's Young Oncologists. *ESMO Open* 2020, 5: e000779. doi: 1136/esmoopen-2020-000779.
17. Montesi G, Di Biase S, Chierchini S, Pavanato G, ViridisGE, Contato E, Mandoliti G. Radiotherapy During COVID-19 Pandemic. How to Create a No Fly Zone: A Northern Italy Experience. *RadiolMed* 2020, 125: 600-603. doi: 10.1007/s11547-020-01217-8.
18. Procedura per la Gestione di "Coronavirus Disease 2019" (COVID-19), ASL 2 Lanciano-Vasto- Chieti, Documento Aziendale N° PGSQA 107, 16/04/2020.
[http://lnx.asl2abruzzo.it/asl/attachments/article/274/REV2-PGSQA107-Procedura-per-la-gestione-della-Coronavirus-Disease-2019-\(COVID-19\)-File-Unico.pdf](http://lnx.asl2abruzzo.it/asl/attachments/article/274/REV2-PGSQA107-Procedura-per-la-gestione-della-Coronavirus-Disease-2019-(COVID-19)-File-Unico.pdf)
19. Informativa sul trattamento dei dati personali per l'accesso alle strutture della ASL Lanciano Vasto Chieti a fini di prevenzione da COVID-19 – Rilievo di temperatura corporea (ai sensi dell'Art. 13 del Regolamento UE 679/2016), Documento Aziendale N° INFIOSQA64-01, 28/05/2020.
<http://lnx.asl2abruzzo.it/a/attachments/article/3112/INFIOSQA64-01%20Informativa%20trattamento%20dati%20personali%20accesso%20strutture%20dell~.pdf>
20. Indicazioni ad Interim per un utilizzo razionale delle protezioni per infezione da SARS-COV-2 nelle attività sanitarie e sociosanitarie (Assistenza a soggetti affetti da COVID-19) nell'attuale scenario emergenziale SARS-COV-2; Gruppo di Lavoro Istituto Superiore di Sanità (ISS) "Prevenzione e Controllo delle Infezioni"; Rapporto ISS COVID-19 - N. 2/2020
https://www.iss.it/documents/20126/0/Rapporto+ISS+COVID+2_+Protezioni_REV.V6.pdf/740f7d89-6a28-0ca1-8f76-368ade332dae?t=1585569978473

21. Attività della Radioterapia Oncologica nella fase II dell'emergenza COVID-19, ASL Lanciano- Vasto-Chieti, Documento Aziendale N° IORADIOCH-01, 18/06/2020. <http://lnx.asl2abruzzo.it/asl/>
22. Zaorsky NG, Yu JB, McBride SM, Dess RT, Jackson WC, Mahal BA, Chen R, Choudhury A, Henry A, Syndikus I, Mitin T, Tree A, Kishan A U, Spratt D E. Prostate Cancer Radiotherapy Recommendations in Response to COVID-19. *AdvRadiatOncol* 2020. doi: 10.1016/j.adro.2020.03.010.
23. Combs SE, Belka C, Niyazi M, Corradini S, Pigorsch S, Wilkens J, Grosu A L, Guckenberger M, Ganswindt U, Bernhardt D . First statement on preparation for the COVID-19 pandemic in large German Speaking University-based radiation oncology departments. *RadiatOncol* 2020; 15:74. doi: 10.1186/s13014-020-01527-1.
24. Coles CE, Aristei C, Bliss J, Boersma L, Brunt AM, Chatterjee S, Hanna G, Jagsi R , Kaidar Person O, Kirby A, Mjaaland I, Meattini I, Luis A M, Marta G N, Offersen B, Poortmans P, Rivera. International guidelines on radiation therapy for breast cancer during the COVID-19 pandemic. *ClinOncol (R CollRadiol)* 2020;32:279–81. doi: 10.1016/j.clon.2020.03.006.
25. Thomson DJ, Palma D, Guckenberger M, Balermipas P, Beitler J J, Blanchard P, Brizel D, Budach W, Caudell J, Corry J, Corvo R, Evans M, Garden A S, Giralt J, Gregoire V, Harari P M, Harrington K, Hitchcock Y J, Johansen J, Kaanders J, Koyfman S, Langendijk J A, Le Q T, Lee N, Margalit D, Mierzwa M, Porceddu S, Soong Y L, Sun Y, Thariat J, Waldron J, Yom S S. Practice recommendations for risk-adapted head and neck cancer radiotherapy during the COVID- 19 pandemic: an ASTRO-ESTRO consensus statement. *Int J Radiat Oncol Biol Phys.* 2020;107:618- 627. doi: 10.1016/j.ijrobp.2020.04.016.
26. J Yahalom, B Dabaja, U Ricardi, Ng A, Mikhaeel N G, Vogelius I R, Illidge T, Qi S, Wirth A, Specht L . ILROG Emergency Guidelines for radiation therapy of hematological malignancies during the COVID-19 Pandemic. *Blood* 2020;135:1829-1832. doi: 1182/blood.2020006028.

Tables

Table 1: Planned actions implemented for radiotherapy activities in lockdown Phase I and in post- lockdown Phase II in the experience of Chieti Radiation Oncology department

Number	PLANNED ACTIONS	
	PHASE I: lockdown	PHASE II: post-lockdown
1	Full maintenance of Radiotherapy treatments on both Linacs	Full maintenance of Radiotherapy treatments on both Linacs
2	Linacs disinfection at each workshift	Linacs disinfection at each workshift
3	Preference for hypofractionated schemes	Preference for hypofractionated schemes
4	Full maintenance of Simul CT and Dosimetry activities	Full maintenance of Simul CT and Dosimetry activities
5	Simul CT disinfection at each workshift	Simul CT disinfection at each workshift
6	Staff: systematic hand washing before and after each clinical and technical procedure	Staff: systematic hand washing before and after each clinical and technical procedure
7	Maintenance of a single clinic room for the first radiotherapy visits. Interruption of oncological follow-up clinic room with phone contact of patients and viewing of laboratory and instrumental exams via telematics. On urgency, patients are booked in the single clinic room active	Full recovery of the oncological follow-up clinic room clinic with double daily shift 8.00 am-1.00 pm and 2.00 pm-5.00 pm with spacing appointments of 1 patient every 45 minutes
8	Preparation of 2 dedicated areas outside the waiting rooms for family members and carers. Entry into the Radiation Oncology center reserved for one family member and only for the first radiotherapy visits or on urgent cases	Preparation of a single pre-waiting room area for family members and carers. Entry into the Radiation Oncology center reserved for one family member and only for the first radiotherapy visits or on urgent cases
9	Triage area with nursing staff: a) entry for 4 patients at a time with a distance of at least 1 meter; b) body temperature detection with Thermo can; c) finding of respiratory symptoms, ocular disorders (conjunctivitis), dysgeusia and anosmia; d) contacts with suspected COVID-19 by filling of the dedicated Hospital questionnaire; e) obligation of surgical mask for patients and carers [18-21]	Triage area with nursing staff: a) entry for 4 patients at a time with a distance of at least 1 meter; b) body temperature detection with Thermo can; c) finding of respiratory symptoms, ocular disorders (conjunctivitis), dysgeusia and anosmia; d) contacts with suspected COVID-19 by filling of the dedicated Hospital questionnaire; e) obligation of surgical mask for patients and carers [18-21]
10	Management of suspected case in triage for patients, staff, carers and third parties: if temperature $\geq 37.5^{\circ}$ repetition after 10 minutes and if confirmed, access to the center is not allowed. Evaluation for deferral of planned clinical or technical performance: in the case of deferral, the patient is rescheduled; in the case of non- deferral, the patient accesses the service by adopting all the safety criteria indicated in points 12 and 13 [19]	Management of suspected case in triage for patients, staff, carers and third parties: if temperature $\geq 37.5^{\circ}$ repetition after 10 minutes and if confirmed, access to the center is not allowed. Evaluation for deferral of planned clinical or technical performance: in the case of deferral, the patient is rescheduled; in the case of non- deferral, the patient accesses the service by adopting all the safety criteria indicated in points 12 and 13 [19]
11	Alternate management of all staff in order to prevent potential multiple infections	/
12	Personal protective equipment.	Personal protective equipment. a)

	a) Visits: surgical mask and gloves; FFP2 mask with superimposed surgical mask in	Visits: surgical mask and gloves; FFP2 mask with superimposed surgical mask in patients
	patients with respiratory symptoms; b) Simul TC and Linear Accelerators: FFP2 mask with superimposed surgical mask and single-use gloves; systematic hand disinfection; visor or protective glasses for Head and Neck and respiratory tumors and for patients with respiratory symptoms [18-21]	with respiratory symptoms; b) Simul TC and Linear Accelerators: FFP2 mask with superimposed surgical mask and single-use gloves; systematic hand disinfection; visor or protective glasses for Head and Neck and respiratory tumors and for patients with respiratory symptoms [18-21]
13	Symptomatic and asymptomatic positive COVID-19 patient: medical evaluation for treatment interruption based on the clinical disease status, with monitoring of the clinical status and treatment recovery after 2 consecutive negative buffer, symptomatic absence and negative CT scan. In the case of treatment continuation because it cannot be deferred: preparation of separate paths; bunker disinfection before and after treatment; FFP2 masks with superimposed surgical mask; single-use gloves and gowns; visors or protective glasses and overshoes for staff; separate and disinfected room for dressing and undressing [21]	Symptomatic and asymptomatic positive COVID-19 patient: medical evaluation for treatment interruption based on the clinical disease status, with monitoring of the clinical status and treatment recovery after 2 consecutive negative buffer, symptomatic absence and negative CT scan. In the case of treatment continuation because it cannot be deferred: preparation of separate paths; bunker disinfection before and after treatment; FFP2 masks with superimposed surgical mask; single-use gloves and gowns; visors or protective glasses and overshoes for staff; separate and disinfected room for dressing and undressing [21]
14	Maintenance of Department meetings for discussion of clinical cases and ongoing scientific work with limited number of professionals and spacing measures	Full recovery of Department Meetings without contingent number of professionals but with maintenance of the safety distance of at least 1 meter
15	Maintaining of multidisciplinary Tumor Board meetings only by requesting consultations, e-mail correspondence, phone contacts and telematic platforms	Full recovery of multidisciplinary Tumor Board meetings

Table 2: Comparison of the number of Radiotherapy performances in the lockdown Phase I (March 9- May4, 2020) with the same period of 2019 in ordinary clinical activity

	Time: March 9- May 4, 2019	Time: March 9 - May, 4, 2020
First Radiotherapy visit	123	121
New patients prepared for Simul CT	137	135
Patients treated on LINACS	151	170

Figures

Italy

Figure 1

Trends and projections of Italy epidemic report. The purple line represents the number of new real daily cases (on the right of the reference scale); the light blue line represents the persistence conditions of the lockdown. In the background (on the left of the scale), the cumulative day per day of the deaths (red), healed (blue) patients, currently positive for intensive units admissions (orange), non-intensive units admissions (yellow) and home isolation (green). (modified by <https://ilsegnalatore.info/>)

Figure 2

COVID-19 cases divided by individual Italian regions. (modified by <https://ilsegnalatore.info/>)

Abruzzo

Figure 3

Trends and projections of Abruzzo epidemic report. The purple line represents the number of new real daily cases (on the right of the reference scale); the light blue line represents the persistence conditions of the lockdown. In the background (scale on the left), the cumulative day by day of the deaths (red) and healed (blue) patients, currently positive for intensive units admissions (orange), non-intensive units admissions (yellow) and home isolations (green). (modified by <https://ilsegnalatore.info/>)